AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) A reference signal canceling apparatus~~second-order bandpass Infinite Impulse Response (IIR) type digital filter with a transfer function H(Z) expressed by~~ $H(Z)=\frac{\left(a_0+a_2Z^{-2}\right)}{\left(1+b_1Z^{-1}+b_2Z^{-2}\right)}$, comprising:

a filter for extracting a reference signal; and

a subtractor for subtracting an output from said filter from said reference signal,

wherein said filter is constructed as a second-order bandpass Infinite Impulse Response (IIR) type digital filter with a transfer function H(Z) expressed by $H(Z)=\frac{\left(a_0+a_2Z^{-2}\right)}{\left(1+b_1Z^{-1}+b_2Z^{-2}\right)}$;

~~a sampling pulse for processing digital signal processing, where the sampling pulse is set to a frequency six times as large as a central frequency of a passing frequency band of the second-order bandpass IIR digital filter;~~

a first-order input feedback coefficient b_1 set at $-1 + 2^{-n}$; and

a second-order input feedback coefficient b_2 set at $1 - 2^{-(n-1)}$, where n is an odd number of 3 or larger,

wherein a zero-order output coefficient a_0 is set at 2^{-n} ($a_0 = 2^{-n}$) and a coefficient a_2 of a second-order output is set at -2^{-n} ($a_2 = -2^{-n}$), and

wherein the first-order input feedback coefficient b_1 and the second-order input feedback coefficient b_2 are set when a sampling pulse, for processing digital signal processing, is set to a frequency six times as large as a central frequency of a passing frequency band of the second-order bandpass IIR digital filter.

2. (canceled).

3. (currently amended) A reference signal canceling apparatus ~~second-order bandpass IIR digital filter with a transfer function H(Z) expressed by~~

~~$H(Z) = \frac{a(1 - Z^{-2})}{(1 + b_1 Z^{-1} + b_2 Z^{-2})}$,~~ comprising:

a filter for extracting a reference signal; and

a subtractor for subtracting an output from said filter from said reference signal,

wherein said filter is constructed as a second-order bandpass Infinite Impulse Response (IIR) type digital filter with a transfer function H(Z) expressed by $H(Z) = \frac{a(1 - Z^{-2})}{(1 + b_1 Z^{-1} + b_2 Z^{-2})}$,

~~a sampling pulse for processing digital signal processing, where the sampling pulse is set to a frequency six times as large as a central frequency of a passing frequency band of the second-order bandpass IIR digital filter;~~

a first-order input feedback coefficient b_1 set at $-1 + 2^{-n}$; and

a second-order input feedback coefficient b_2 set at $1 - 2^{-(n-1)}$, where n is an odd number of 3 or larger,

wherein ~~the~~ a second-order output is subtracted from ~~the~~ a zero-order output and the subtraction result is multiplied by a ($a=2^{-n}$), and

wherein the first-order input feedback coefficient b_1 and the second-order input feedback coefficient b_2 are set when a sampling pulse, for processing digital signal processing, is set to a frequency six times as large as a central frequency of a passing frequency band of the second-order bandpass IIR digital filter.

4. (previously presented) A reference signal canceling apparatus comprising:

a filter for extracting a reference signal contained in a frequency modulation (FM) detected signal; and

a subtracter for subtracting an output from the filter from said FM detected signal,

wherein said filter is constructed as a second-order bandpass Infinite Impulse Response (IIR) type digital filter with a transfer function H(Z) expressed by $H(Z)=\frac{\left(a_0+a_1Z^{-1}+a_2Z^{-2}\right)}{\left(1+b_1Z^{-1}+b_2Z^{-2}\right)}$, and when a sampling pulse for processing digital signal processing is set to a frequency is six times as large as a central frequency of a passing frequency band of the second-order bandpass IIR digital filter, a first-order input feedback coefficient b_1 is set at $-1 + 2^{-n}$ and a second-order input feedback coefficient b_2 is set at $1 - 2^{-(n-1)}$, where n is an odd number of 3 or larger, and a_0, a_1, and a_2 are output coefficients having real values.

5. (currently amended) A method of canceling a reference signal in a reference signal canceling apparatus having a filter for extracting a reference signal contained in a

frequency modulation (FM) detected signal and a subtracter for subtracting an output from the filter from said FM detected signal, said method comprising:

constructing said filter as a second-order bandpass Infinite Impulse Response (IIR) type digital filter with a transfer function H(Z) expressed by $H(Z)=\frac{\left(a_0+a_1Z^{-1}+a_2Z^{-2}\right)}{\left(1+b_1Z^{-1}+b_2Z^{-2}\right)}$;

~~setting a sampling pulse for processing digital signal processing to a frequency six times as large as a central frequency of a passing frequency band of the second-order bandpass IIR digital filter;~~

setting a first-order input feedback coefficient b_1 at $-1 + 2^{-n}$; and

setting a second-order input feedback coefficient b_2 at $1 - 2^{-(n-1)}$, where n is an odd number of 3 or larger, and a_0, a_1, and a_2 are output coefficients having real values,

wherein the first-order input feedback coefficient and the second-order input feedback coefficient are set when a sampling pulse, for processing digital signal processing, is set to a frequency six times as large as a central frequency of a passing frequency band of the second-order bandpass IIR digital filter.